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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,010	02/22/2002	Rajiv K. Singh	5853-224	1904

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT PAPER NUMBER

1765

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/082,010

**Applicant(s)**

SINGH ET AL.

**Examiner**

Lynette T. Umez-Eronini

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-10,17-26 and 29-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6,8-10,17-21,26 and 31-37 is/are rejected.
- 7) ☒ Claim(s) 2-5,22-25 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/22/2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

This communication is in response to Applicants' Amendment filed 5/3/2005. A new reference, which teaches previously allowable subject matter of claim 8, was found. Hence, a new rejection is presented.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 6, 9, 10 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (US 6,045,577).

Garg teaches nano-sized powder of alpha alumina having silica coating thereon (column 5, lines 7-10). Garg further teaches a polishing slurry is comprised of a alumina powder has a silica coating wherein 95% of the particles have widths of from 20 to about 50 nanometers while less than 5% have particle sizes greater than 100 nanometers and is dispersed in a liquid dispersion medium (claims 6 and 9). The aforementioned reads on,

A slurry for chemical mechanical polishing (CMP), comprising:

a bulk solution; and

a plurality of nanoporous comprising particles, **in claim 1;**

wherein said nanosize nanoporous particles comprise nanoporous cores coated with a solid material coating or first core material coated with a second material, and second material being a nanoporous coating, **in claim 6**; and

wherein nanosize nanoporous particles comprising particles comprise a first core material coated with a second material, and second material being a nanoporous coating, **in claim 18**.

The said above encompasses an average particle size of said nanosize nanoporous comprising particles is less than 500 nm, **in claim 9** and is from 200 to 500 nm, **in claim 10**.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 17 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garg as applied to claim 1 above.

Garg differs in failing to teach the slurry wherein a porosity of said nanosize nanoporous particles is in a range from 10 to 60%, **in claim 17**; and wherein a concentration of said composite particles in said slurry is from approximately 1% to 40% by weight, **in claim 35**.

However, Garg illustrates the specific combination of bulk solution and nanoporous particles and nano-sized alpha alumina particles having silica coating is known. As a result, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any porosity of the nanoporous particles and weight percent of the alumina coated silica particles (same as applicants' composite particles) in the Garg reference that would effectively accomplish the disclosed composition because it has been held that there is no invention where the difference in proportions is not critical and was ascertained by routine experimentation because the determination of workable ranges is not considered inventive. See *In re Swain and Adams*, 70 USPQ 412 (CPA 1946).

6. Claims 8, 19-21, 31-34, and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garg (US '577) as applied to claim 1 above, and further in view of Li et al. (IS 6,458,017 B1).

Garg differs in failing to teach the slurry comprises at least one species selected from the group consisting of a polyhalide ion,  $I_2$ ,  $Br_2$ , and  $F_2$ , **in claim 8**; at least one passivating additive, **in claim 19**; at least one complexing agent, as specified **in claims 20-21**; at least one salt, **in claims 31-32**; an pH 6-13 and 8-11, respectively, **in claims 33-34**; and at least one oxidizer, **in claims 36-37**.

Li teaches and illustrates the specific combination of additives in a polishing slurry comprising oxidizers (column 5, lines 49-50); chelate complex (same as applicants' complexing agent), (column 5, lines 55-56); benzotriazole (same as applicants' passivating agent), (column 6, lines 2-3); surfactants (column 6, lines 15-21); an intermediate pH of 3-7 (column 6, lines 2-3) and pH values higher than 10 (column 6, lines 24-25); and suspension media comprising  $IBr_2$  and  $BrF_3$  (column 9, lines 12-14) along with a nanometer size particle (column 3, lines 26-27) is known.

Hence it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Garg by adding known additives as taught by Li to a polishing solution that would effectively accomplish the disclosed composition.

7. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garg (US'577) as applied to claim 1 above, and further in view of Sahota et al. (US 6,503,418 B2).

Sahota teaches organic additive such as PVA and PAA, which suppresses formation of precipitates during cmp of copper metal layer (Abstract and column 4, lines 37-47 and claim 1).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Garg by using a polymer additives as taught by Sahota for the purpose of suppressing formation of precipitates during cmp of copper metal layer (Sahota, column 4, lines 37-47).

### ***Allowable Subject Matter***

8. Claims 2, 3, 4, 5, 22, 23, 24, 25, and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: As to claims 2, 3, 4, 5, 23, 25 and 30, the prior art of record taken alone or in combination fails to suggest, teach, and or render obvious at least and selective adsorption additive wherein said selective adsorption additive is in a concentration of from 6 to 1,000 critical micelle concentration (CMC) when said selective adsorption additive is non-ionic and from 1 to 1,000 CMC when selective adsorption additive is zwitterionic, anionic or cationic, said selective adsorption additive self assembling in said bulk solution, in combination with the rest of the limitations of the said claims.

### ***Response to Arguments***

10. Applicant's arguments with respect to claims 1-6, 8-10, 17-26, and 29-37 have been considered but are moot in view of the new ground(s) of rejection because the former prior art of record failed to teach, a slurry comprising: a plurality of nanosize

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nanoporous comprising particles, as recited in (currently amended) **claims 1 and 15**; wherein said nanosize nanoporous particles comprise nanoporous cores . . . or first core material coated with a second material, said second material being a nanoporous coating, as recited in (currently amended) **claims 6 and 18**; wherein an average particle size of said nanosize nanoporous comprising particles is less than 500 nm and is from 200 to 500 nm, as recited respectively, in (currently amended) **claims 9 and 10**; and wherein a porosity of said nanosize nanoporous particles is in a range from 10 to 60%, as recited in (currently amended) **claim 17**. Also, a new reference, which teaches previously allowable subject matter of claim 8, was found. Hence, a new rejection is presented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 5171-272-1465.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should



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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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ltue

July 21, 2005

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**

A handwritten signature in black ink, appearing to be 'N. Norton', written below the printed name and title.